Message

From: harlow.david@epa.gov [harlow.david@epa.gov]
Sent: 3/25/2019 9:53:04 PM
To: Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]
CC: Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]; Lewis, Josh [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b22d1d3bb3f84436a524f76ab6c79d7e-JOLEWIS]
Subject: Re: Shell Meeting Request on OOOOa Rulemaking

Emily,

That's great, thank you.

Sent from my iPhone

On Mar 25, 2019, at 2:26 PM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

> Absolutely David. I will check in with Clint on this and if appropriate work with Josh and Delaney to take steps to get this setup for IO staff.
>
> **From:** Harlow, David
> **Sent:** Monday, March 25, 2019 2:22 PM
> **To:** Atkinson, Emily <Atkinson.Emily@epa.gov>
> **Cc:** Woods, Clint <woods.clint@epa.gov>; Dominguez, Alexander <dominguez.alexander@epa.gov>
> **Subject:** Fwd: Shell Meeting Request on OOOOa Rulemaking
>
> Emily,
>
> My apologies foisting this on you, but if you have the opportunity, would you be so kind as to touch base

Deliberative Process / Ex. 5

> Thank you.
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> **From:** Stephen Fotis <scf@vnf.com>
> **Date:** March 25, 2019 at 10:36:50 AM EDT

To: "harlow.david@epa.gov" <harlow.david@epa.gov>
Subject: Re: Shell Meeting Request on OOOOa Rulemaking

Hi David
Can you please respond to my emails and calls about scheduling a brief meeting with Shell on the OOOOa rule? I hope you're okay given that it is uncharacteristic for you to not provide any response.
Thanks
Stephen

On Mar 21, 2019, at 1:17 PM, Stephen Fotis <scf@vnf.com> wrote:

> Hi David – I am following up on my voice message about finding a time to meet with Shell during the week of April 1-5 on the OOOOa rule. Several folks from Shell will be in town that week and would like to have the opportunity to discuss Shell's views on a short list of priority issues. We can be flexible on the timing. If you need to talk or have questions, please call my cell at 402.413-2321.
> Many Thanks,
> Stephen
>
> ---
>
> **From:** Stephen Fotis
> **Sent:** Sunday, March 17, 2019 4:42 PM
> **To:** harlow.david@epa.gov
> **Subject:** Shell Meeting Request on OOOOa Rulemaking
>
> David – On behalf of Shell, I would like to meet with you, along with the appropriate EPA staff, on several key technical issues relating to the proposed Subpart OOOOa "technical fix" rule that EPA issued last year and is currently pending before the Agency. Several key Shell representatives would be available to meet in your offices with you and your staff, with any other OAQPS staff in North Carolina would participate by telephone. We would like to schedule the meeting for some time during the first week of April (*i.e.,* April 1-5) if that is possible on your end.
> If you have questions or need additional information, please don't hesitate to give me a call or send an email.
> Many thanks and hope that you're doing well.
> Best,
> Stephen
>
> Stephen Fotis
> Partner
> Van Ness Feldman LLP
> scf@vnf.com
> (202) 298-1908
>
>

notify the sender immediately by telephone (202-298-1800) or by return e-mail and delete it from his or her computer.

Appointment

From: Wehrum, Bill [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=33D96AE800CF43A3911D94A7130B6C41-WEHRUM, WIL]
Sent: 11/30/2017 7:29:32 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Dunham, Sarah [Dunham.Sarah@epa.gov]; Gunning, Paul [Gunning.Paul@epa.gov]; Tsirigotis, Peter [Tsirigotis.Peter@epa.gov]; Page, Steve [Page.Steve@epa.gov]; Cozzie, David [Cozzie.David@epa.gov]; Koerber, Mike [Koerber.Mike@epa.gov]; Gunasekara, Mandy [Gunasekara.Mandy@epa.gov]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Harnett, Bill [Harnett.Bill@epa.gov]; Woods, Clinton [woods.clinton@epa.gov]

Subject: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Attachments: FW: Meeting Request for Shell from S. Fotis; Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis; RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis
Location: WJC-N 5400 + Video with OAQPS

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Tentative

To: Bill Wehrum, Mandy Gunasekara, David Harlow, Sarah Dunham, Paul Gunning, Peter Tsirigotis, Steve Page, David Cozzie, Mike Koerber; Harnett, Bill; Woods, Clint

Outside Attendees (in person):

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman


FW: Meeting Request for Shell...


Confirmed 12/13 at 11am: Meeting R...


RE: Confirmed 12/13 at 11am: ...

Message

From: Atkinson, Emily [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=BB2155ADEF6A44AEA9410741F0C01D27-ATKINSON, EMILY]
Sent: 11/30/2017 8:15:15 PM
To: Stephen Fotis [scf@vnf.com]
CC: Loving, Shanita [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=439ce9c2d2104080a1b5908d3402bf20-Loving, Shanita]
Subject: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis

Hi Stephen,
You are confirmed for a 45 minute in person meeting on Wednesday, December 13, 2017 at 11:00am with Bill Wehrum.
Directions and procedures to 1200 Pennsylvania Avenue NW:

Metro: If you come by Metro get off at the Federal Triangle metro stop. Exit the metro station and go up two sets of escalators to the surface level and turn right. You will see a short staircase and wheelchair ramp leading to a set of glass doors with the EPA logo - that is the William Jefferson Clinton Federal Building, North Entrance.

Taxi: Direct the taxi to drop you off on 12th Street NW, between Constitution and Pennsylvania Avenues, at the elevator for the Federal Triangle metro stop - this is almost exactly half way between the two avenues on 12th Street NW. Facing the building with the EPA logo and American flags, walk toward the building and take the glass door on your right hand side with the escalators going down to the metro on your left – that is the North Lobby of the William Jefferson Clinton building.

Security Procedures: A government issued photo id is required to enter the building and it is suggested you arrive 15 minutes early in order to be cleared and arrive at the meeting room on time. Upon entering the lobby, the meeting attendees will be asked to pass through security and provide a photo ID for entrance. Let the guards know that you were instructed to call 202-564-7404 for a security escort.

Please send me a list of participants in advance of the meeting and feel free to contact me should you need any additional information.

Emily

Emily Atkinson
Management Analyst/Office Manager
Immediate Office of the Assistant Administrator
Office of Air and Radiation, USEPA
Room 5412B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Stephen Fotis [mailto:scf@vnf.com]
Sent: Thursday, November 30, 2017 3:04 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Cc: Loving, Shanita <Loving.Shanita@epa.gov>
Subject: RE: Meeting Request for Shell from S. Fotis

Emily – Wednesday, December 13 at 11 AM works for us. (Your email said "Friday Wednesday, December 13", but I assume that you meant Wednesday because Friday is the 15th .) Thank you for assisting in scheduling a time so

quickly. Also, we have no preference to schedule a Toyota meeting on same day. Please find a time or times that work best for Bill and his staff, and I will do my best to make it work for those attending on behalf of Toyota.
Thanks again!
Stephen

Stephen Fotis
Partner
Van Ness Feldman LLP
scf@vnf.com
(202) 298-1908

From: Atkinson, Emily [mailto:Atkinson.Emily@epa.gov]
Sent: Thursday, November 30, 2017 2:30 PM
To: Stephen Fotis
Cc: Loving, Shanita
Subject: FW: Meeting Request for Shell from S. Fotis

Hi Stephen,

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Please advise if this could work on your end.

And I will send you options for the Toyota meeting shortly. Let me know if you prefer to do these on the same day and I will see what I can do to get them somewhat close together on the calendar.

Emily Atkinson
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Room 5412B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Stephen Fotis [mailto:scf@vnf.com]
Sent: Wednesday, November 29, 2017 12:37 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: Meeting Requests for Toyota and Shell

Thank you Emily for your assistance.
Best,
Stephen

Stephen Fotis

Partner
Van Ness Feldman LLP
scf@vnf.com
(202) 298-1908

From: Atkinson, Emily [mailto:Atkinson.Emily@epa.gov]
Sent: Wednesday, November 29, 2017 11:51 AM
To: Stephen Fotis
Subject: RE: Meeting Requests for Toyota and Shell

Hi Stephen,

We are reviewing scheduling options now and will get back to you shortly.

Emily Atkinson
Management Analyst/Office Manager
Immediate Office of the Assistant Administrator
Office of Air and Radiation, USEPA
Room 5412B, 1200 Pennsylvania Avenue NW
Washington, DC 20460
Voice: 202-564-1850
Email: atkinson.emily@epa.gov

From: Stephen Fotis [mailto:scf@vnf.com]
Sent: Tuesday, November 28, 2017 5:32 PM
To: Atkinson, Emily <Atkinson.Emily@epa.gov>
Subject: RE: Meeting Requests for Toyota and Shell

Hi Emily – As suggested by Bill in his email below, I am following up with you regarding the scheduling of two separate meetings with Bill – one with Toyota on the Mid Term Review (MTR) for autos/light duty trucks, and the other with Shell on the OOOOa NSPS reconsideration rulemaking. Could you please advise me as to possible times that we might schedule these meetings? If possible, I'd like to try to schedule meetings for later this December before the holidays. Many thanks for your assistance.
Stephen

Stephen Fotis
Partner
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(202) 298-1908

From: Wehrum, Bill [mailto:Wehrum.Bill@epa.gov]
Sent: Monday, November 27, 2017 12:29 PM
To: Stephen Fotis
Cc: Atkinson, Emily
Subject: RE: Meeting Requests for Toyota and Shell

Thanks Stephen. I'm copying Emily Atkinson. She can work with you to find times.

From: Stephen Fotis [mailto:scf@vnf.com]
Sent: Monday, November 27, 2017 11:29 AM
To: Wehrum, Bill <Wehrum.Bill@epa.gov>; Wehrum, Bill <Wehrum.Bill@epa.gov>
Subject: Meeting Requests for Toyota and Shell

Bill – I hope that you had a good Thanksgiving and had some time to relax. As a follow-up to our discussions of last week, both Toyota and Shell are happy to accommodate your request and delay their meetings until later this December or early January. However, I would like to see if we can schedule the meeting time for each now given that your calendar will no doubt be filling up quickly and the issues both want to raise are time sensitive.
Would it be appropriate for me to follow-up with Shanita or someone else on scheduling meeting dates?
Best,
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Stephen Fotis
Partner
Van Ness Feldman LLP
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(202) 298-1908

From: Stephen Fotis
Sent: Wednesday, November 22, 2017 2:46 PM
To: wehrum.bill@epa.gov; wehrum.william@epa.gov
Subject: Follow-up to Your Message on Meeting Requests

Bill – Many thanks for your call last night regarding my two meeting requests. I am now checking with the client in each case but will most likely not be getting back to you with answer until after the Thanksgiving holiday. However, I would be very surprised if there is anything compelling or urgent that would require scheduling either one of the meetings over the next few weeks.
Have a great Thanksgiving and I will be getting back to you next week.
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Sent: 11/30/2017 7:30:14 PM
To: scf@vnf.com
CC: Loving, Shanita [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=439ce9c2d2104080a1b5908d3402bf20-Loving, Shanita]
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Sent: Wednesday, November 29, 2017 11:51 AM

To: Stephen Fotis
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Subject: RE: Meeting Requests for Toyota and Shell

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Sent: Monday, November 27, 2017 11:29 AM
To: Wehrum, Bill <Wehrum.Bill@epa.gov>; Wehrum, Bill <Wehrum.Bill@epa.gov>
Subject: Meeting Requests for Toyota and Shell

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Message

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Sent: 12/11/2017 10:21:25 PM
To: Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]
CC: Loving, Shanita [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=439ce9c2d2104080a1b5908d3402bf20-Loving, Shanita]
Subject: RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis

Hi Emily – As you know, Shell is scheduled to meet with Bill Wehrum this Wednesday, December 13 at 11 AM. The names of those attending the meeting with Bill on behalf of Shell include the following:

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman

Again, the main topic of discussion will be the regulation of methane and EPA's reconsideration of Subpart OOOOa rules. We plan to discuss briefly several other regulatory issues, such as NSR reform.

If possible, could be please let me know who from EPA Bill has invited to participate in this meeting.
Many thanks for all of your assistance.
Best regards,
Stephen

Stephen Fotis
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scf@vnf.com
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Cc: Atkinson, Emily
Subject: RE: Meeting Requests for Toyota and Shell

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Subject: Meeting Requests for Toyota and Shell

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To: wehrum.bill@epa.gov; wehrum.william@epa.gov
Subject: Follow-up to Your Message on Meeting Requests

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(202) 298-1908

This communication may contain information and/or metadata that is legally privileged, confidential or exempt from disclosure. If you are not the intended recipient, please do not read or review the content and/or metadata and do not disseminate, distribute or copy this communication. Anyone who receives this message in error should notify the sender immediately by telephone (202-298-1800) or by return e-mail and delete it from his or her computer.

Message

From: Rakosnik, Delaney [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=274573739A9F446883072599086EDEDD-RAKOSNIK, D]
Sent: 4/3/2019 2:36:59 PM
To: Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]
Subject: FW: Materials: 4/3 David H meeting w/Shell - DO NOT POST OR DISTRIBUTE IN MEETING ROOM
Attachments: Shell 4.3.19.docx

Please see attached.

From: Ward, Hillary
Sent: Wednesday, April 3, 2019 7:37 AM
To: OAR Briefings <OAR_Briefings@epa.gov>
Cc: Koerber, Mike <Koerber.Mike@epa.gov>; McKinney, Voronina <mckinney.voronina@epa.gov>
Subject: Materials: 4/3 David H meeting w/Shell - DO NOT POST OR DISTRIBUTE IN MEETING ROOM

Hello,

Please see the attached background pager for David Harlow's meeting with Shell. This pager is an internal document – not to be distributed in meeting room.

Thanks,

Hillary Ward
USEPA, Office of Air Quality Planning and Standards
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Message

From: Rakosnik, Delaney [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=274573739A9F446883072599086EDEDD-RAKOSNIK, D]
Sent: 12/14/2018 9:23:42 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]; Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]; Lewis, Josh [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b22d1d3bb3f84436a524f76ab6c79d7e-JOLEWIS]; Shaw, Betsy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=31ca1476a7674825a131cb2c0d6c88c8-BShaw03]
Subject: Calendar + Materials for Monday 12.17
Attachments: Wehrum Bill Calendar.ics; GHGRP Update 12-2018.pptx; Appendix to GHGRP Update 12-2018.docx; OAR_Briefing_179B_Guidance_12_13_2018.docx; ATT05606; ATT76845; ATT88197; ATT41390; ATT68043; ATT65144; ATT32489; ATT88254; ATT83295; ATT12973; ATT07680; ATT66987; ATT72050; ATT94710; ATT03733; ATT99997; ATT39692; ATT12852

Mon, Dec 17

- ☐ All Day
- ☐ **Before 8:00 AM**
- ☐ **8:00 AM – 9:30 AM**
- ▩ 9:30 AM – 10:30 AM
- ▩ 10:30 AM – 11:30 AM
- ☐ 11:00 AM – 12:00 PM
- ▩ 11:30 AM – 12:00 PM
- ☐ **12:00 PM – 12:30 PM**
- ▩ 12:30 PM – 1:15 PM

Deliberative Process / Ex. 5

- ☐ **1:15 PM – 1:30 PM**
- ▩ 1:30 PM – 2:00 PM
- ▩ 2:00 PM – 3:00 PM
- ▩ 3:00 PM – 3:45 PM
- ☐ **3:45 PM – 4:00 PM**
- ▩ 4:00 PM – 4:30 PM
- ▩ 4:30 PM – 5:00 PM
- ☐ **After 5:00 PM**

Deliberative Process / Ex. 5

Meeting with Hess and Whiting re: OOOOa Storage Tanks (CONFIRMED)

Deliberative Process / Ex. 5

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Wehrum Bill
Calendar.ics

Environmental Science & Technology

Policy Analysis

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Assessing Human Health $PM_{2.5}$ and Ozone Impacts from U.S. Oil and Natural Gas Sector Emissions in 2025

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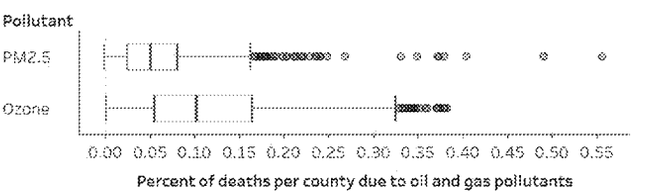
Supporting Information

ABSTRACT: Incomplete information regarding emissions from oil and natural gas production has historically made it challenging to characterize the air quality or air pollution-related health impacts for this sector in the United States. Using an emissions inventory for the oil and natural gas sector that reflects information regarding the level and distribution of $PM_{2.5}$ and ozone precursor emissions, we simulate annual mean $PM_{2.5}$ and summer season average daily 8 h maximum ozone concentrations with the Comprehensive Air-Quality Model with extensions (CAMx). We quantify the incidence and economic value of $PM_{2.5}$ and ozone health related effects using the environmental Benefits Mapping and Analysis Program (BenMAP). We find that ambient concentrations of $PM_{2.5}$ and ozone, and associated health impacts, are highest in a handful of states including Colorado, Pennsylvania, Texas and West Virginia. On a per-ton basis, the benefits of reducing $PM_{2.5}$ precursor emissions from this sector vary by pollutant species, and range from between $6,300 and $320,000, while the value of reducing ozone precursors ranges from $500 to $8,200 in the year 2025 (2015$).



INTRODUCTION

Air pollution health burden assessments often characterize the ambient levels of pollution and enumerate the adverse health outcomes associated with emissions from total anthropogenic sources or certain classes of industrial and mobile sectors.[1−4] Studies quantifying the economic value of these impacts have also reported estimates of the monetized benefits of reducing emissions that are precursors to fine particles (particulate matter sized 2.5 μm and smaller, that is, $PM_{2.5}$) from a given sector; these are often referred to as a "benefit per-ton."[5−7] This literature provides insight regarding the size, distribution, and economic value of the air pollution impacts associated with emissions from a broad array of industrial activities including industrial boilers, cement kilns and refineries among other sectors.[8]

While there is a growing literature examining air quality and human health impacts attributable to the oil and natural gas sector in the United States, we were unable to identify any studies employing a national emissions inventory coupled with a photochemical grid model to simulate the nonlinear formation of pollutants including ozone and $PM_{2.5}$ attributable to this sector.[9] Some studies have assessed the risks attributable to this sector within discrete geographic areas and employed less computationally complex air quality modeling approaches to monetize health impacts from oil and natural gas production nationwide.[10,11]

This work has been encumbered in part by limited data regarding the level and geographic distribution of emissions associated with oil and natural gas production across the U.S. As we describe below, emissions from this sector tend to originate from a large number of small but geographically diffuse sources located throughout several basins, making it challenging to estimate both the level and location of emissions accurately. These uncertainties, in turn, have made it difficult to simulate $PM_{2.5}$ and ozone air quality with confidence. In this paper, we apply an emissions inventory for the oil and natural gas sector that reflects a spatially detailed nationwide estimate of the level and distribution of emissions from this sector. This version of the U.S. Environmental Protection Agency's (EPA) National Emissions Inventory (NEI) for the year 2011 includes data that States provided as part of the process for developing the NEI; these data substantially improve our ability to characterize oil and natural gas emissions over space and time as compared to previous versions of the emissions inventory for these sources.

This improved inventory permits us to simulate of air quality impacts from this sector's emissions, with the goal of answering three key questions:

- What are the annual average $PM_{2.5}$ concentrations and summer season average daily 8-h maximum ozone concentrations associated with this sector?
- What is the human health burden—in terms of $PM_{2.5}$ and ozone-related premature deaths and illnesses—

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Table 1. Emission Levels for the Oil and Natural Gas and All Other Sectors in 2025 (tons/year)

	pollutant					
	NO_x	SO_2	NH_3	CO	VOC	elemental and organic carbon
oil and gas	1 190 846	108 619	5927	978 765	3 671 787	10 451
biogenics	1 020 456			6 749 945	44 712 816	
fugitive dusts						51 370
residential wood combustion	34 805	7619	18 211	2 328 506	408 910	208 118
industrial point sources	1 021 969	783 630	66 612	1 884 412	786 950	69 062
electricity generating units	2 021 937	2 089 206	46 238	907 624	42 253	23 149
area sources	75 462	95 102	94 938	278	3 426 185	212 672
wildland fires[a]	333 404	165 790	329 398	20 566 821	4 689 022	1 075 975

[a]Assumed constant from the 2011 baseline.

attributable to the oil and natural gas sector and how is this burden distributed over the U.S?

- What are the health benefits—in terms of avoided deaths and illnesses—of reducing $PM_{2.5}$ and ozone precursor emissions on a per ton basis and how does the benefit per ton (BPT) vary across pollutant precursor?

Below we describe our approach to modeling emissions and air quality before detailing our methodology for estimating the incidence and economic value of air pollution-attributable premature deaths and illnesses and calculating BPT values. We then present the results of this analysis before discussing the implications of this research.

MATERIALS AND METHODS

Estimating Emissions. This analysis of the oil and natural gas sector draws upon estimates of pollutant emissions reported in the U.S. EPA NEI, which incorporates national activity, emission factors and basin-specific information submitted by State and Local agencies for this sector. Activity data are specific to each county for the year 2011. For the purposes of this analysis, we define the oil and natural gas sector as comprising an array of processes and equipment, including: drill rigs, workover rigs, well completions, well hydraulic fracturing, heaters, storage tanks, mud degassing, dehydration, pneumatics, well venting, fugitives, truck loading, wellhead engines, pipeline compressor engines, flaring, artificial lifts, and gas actuated pumps. These sources reflect the production and transportation of crude oil and natural gas and distribution of natural gas but exclude refineries and the distribution of refined products. The U.S. EPA defined the sector to reflect those activities covered by the New Source Performance Standards. Previous U.S. EPA analyses have assessed the air quality and health impacts associated with pollutants emitted during the refining process and so we exclude this sector here.[12]

Most oil and natural gas emissions data are estimated by county and spatially allocated to the model grid using surrogates that are based on year 2011 well locations and attributes related to the production of oil and natural gas and their byproducts. This procedure is described in the technical support document "Preparation of Emission Inventories for the Version 6.2, 2011 Emissions Modeling Platform"; the "platform" in this context describes the baseline inventory, meteorological model and air quality model used to simulate air quality.[13,14]

Beginning with this inventory, the U.S. EPA developed a method for estimating nonpoint emissions for the oil and natural gas production sector. In April of 2012, the Agency began collaborating with an extensive national workgroup comprised of state and regional emissions developers. This effort yielded a substantially improved Nonpoint Oil and Gas Emission Estimation Tool, which produces county-level emissions for calendar year 2011 for criteria pollutants and their precursors including volatile organic compounds and ammonia.[15] Both states and the U.S. EPA applied this tool to estimate emissions, either using the default tool inputs, or by providing their own basin- and/or county-specific inputs.

In brief, as part of a national outreach effort, U.S. EPA received data from two Regional Planning Organizations—the Lake Michigan Air Directors Consortium (representing Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin) and the Mid-Atlantic Regional Air Management Association (representing 10 state and local agencies including the Allegheny County Air Quality Program, the Pennsylvania Department of Environmental Protection, the North Carolina Department of Natural Resources, the Virginia Department of Environmental Quality and the West Virginia Department of Environmental Protection). In total, the states submitting data included CA, CT, DC, DE, IA, ME, MI, NC, NE, NY, PA, OK, TX, UT, VA, WA. Each organization provided information including the location, emission rate and controls. VOC and $PM_{2.5}$ emissions are speciated based on basin-specific speciation factors provided by the Western Regional Air Partnership.[13,14] National VOC and $PM_{2.5}$ speciation profiles were used for this assessment where location speciation profiles were unavailable. Annual total emissions for this sector are evenly distributed across each hour of each day using temporal allocation factors that account for units operating continuously throughout the year.

To account for the expected change in the size and distribution of this sector over time, we projected the 2011 sector emissions to the year 2025 using economic growth factors based on product and consumption indicators derived from the Annual Energy Outlook (AEO) 2014 (Table 1).[13,14] We selected a future year of 2025 because it was most relevant for U.S. EPA air quality planning purposes. The AEO projected growth rates for each U.S. Census Division, which were then assigned to each basin. Projected levels of emissions from the sector can be useful to policy makers as they seek to understand the future air quality and health impacts attributable to the sector. However, as we note below, this procedure also introduces uncertainty to the analysis. Aside from the growth factors, emission reductions are reflected for some oil and natural gas categories including reductions of criteria air pollutants due to stationary reciprocating internal combustion engine regulations that reduce emissions of hazardous air pollutants and New Source Performance

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Standards. Additional details regarding our approach are available in the Version 6.2, 2011 Emissions Modeling Platform TSD.

Air Quality Modeling Simulations. The Comprehensive Air-Quality Model with extensions (CAMx) version 6.20[16,17] was applied for the entire year of 2011 with a 10 day "spin-up" period at the end of 2010 to minimize the influence of initial conditions. The model domain covered the contiguous United States with 12 km by 12 km sized grid cells. The surface to model top (~15 km) was resolved with 25 layers with most in the boundary layer to best capture the diurnal variation in the surface mixing layer. CAMx has treatment of gas-phase chemistry based on Carbon Bond 6, inorganic particulate matter thermodynamics based on ISORROPIA, aqueous phase chemistry, and semivolatile partitioning of VOC to secondary organic aerosol.[16,18,19] In this assessment, CAMx was not modified to capture wintertime ozone formation that is associated with production activities in certain oil and natural gas basins, meaning the ozone air quality and health impacts provided here are entirely associated with traditional warm season (May 1 to September 30) ozone formation.[20,21] Moreover, the risk coefficients we used to quantify ozone effects were drawn from studies assessing the health risks associated with warm season ozone exposure; modeling ozone in this way ensures that the exposure estimates are consistent with the health impact assessment described below.

CAMx was applied with source apportionment to differentiate the contribution of the oil and natural gas sector from all other emissions. The contribution of oil and natural gas emissions was tracked to model estimated primary ($PM_{2.5}$ elemental carbon, $PM_{2.5}$ organic carbon, and crustal compounds) and secondary (e.g., ozone contributions from NO_x, ozone contributions from VOC, $PM_{2.5}$ sulfate ion, $PM_{2.5}$ nitrate ion, and $PM_{2.5}$ ammonium ion) pollutants.[16,22−24] The contribution of VOC emissions to secondary organic aerosol (SOA) were not tracked because the model estimates a very small amount of anthropogenic SOA (from all sources) and while this sector emits a large amount of VOC, the bulk of the species contributing to the emissions mass (e.g., methane, ethane, propane) are not known to yield large amounts of SOA. Year 2011 meteorological inputs were generated using the Weather Research and Forecasting model.[25] WRF was applied with a domain consistent with the photochemical grid model and has been shown to compare well with surface, upper air, and mixing layer height measurements.[26] Further details about the WRF configuration are provided in the Supporting Information. Initial chemical conditions and boundary inflow were extracted from a global model simulation using a database tool developed jointly by the University of Florida and the U.S. EPA, and subsequently translated to match the domain and chemical species employed for this assessment.[27] Both biogenic and anthropogenic emissions were incorporated into the air quality modeling. Biogenic emissions were estimated using the Biogenic Emission Inventory System version 3.6.1.[13,28,29] Anthropogenic emissions were based on the 2011 National Emission Inventory version 2 as described in the associated technical support document.[14,30] Wildland fire emissions were also included in the 2011 NEI version 2 and are based on known fires in 2011.[31]

Estimating Counts of Air Pollution-Related Deaths and Illnesses Attributable to the Oil and Natural Gas Sector. We calculate a health impact function to quantify counts of premature deaths and illnesses attributable to the model-predicted $PM_{2.5}$ and ozone from the oil and natural gas sector. For each $PM_{2.5}$ and ozone human health end point we calculate a separate health impact function. Each function specifies four input parameters: (1) an effect coefficient (or, beta parameter) from a published air pollution epidemiology study; (2) a count of the number of people affected in each 12 km by 12 km air quality grid from the U.S. census; (3) the air quality concentration to which the population is exposed from the photochemical model; (4) a baseline rate of death or disease among this population from Centers for Disease Control and Prevention and the Agency for Healthcare Research and Quality.

To automate the procedure for calculating health impacts we used the open-source environmental Benefits Mapping and Analysis Program—Community Edition software program.[32] The $PM_{2.5}$-related health outcomes we quantify include premature death, respiratory hospital admissions, cardiovascular hospital admissions, emergency department visits for asthma, upper respiratory symptoms, lower respiratory symptoms, days of work lost, days of school lost, cases of aggravated asthma, and cases of acute respiratory symptoms. We quantify ozone-related end points including premature death, respiratory hospital admissions, respiratory emergency department visits, exacerbated asthma, and days of school missed.

Using the health impact function for $PM_{2.5}$-related deaths as an example, we specify the input parameters below. In eq 1, we estimated the number of $PM_{2.5}$-related total deaths (y_{ij}) for adults in each county j ($j = 1,\cdots,J$ where J is the total number of counties) as

$$y_j = \Sigma_a y_{ja}$$

$$y_{ija} = m0_{ja} \times (e^{\beta \cdot C_k} - 1) \times P_{ika}, \quad (1)$$

where β is a beta coefficient for all-cause mortality in adults associated with annual average exposure to $PM_{2.5}$, $m0_{ja}$ is the baseline all-cause death rate for adults in county j stratified in 10-year age bins, C_k is the annual mean $PM_{2.5}$ concentration in air quality grid cell k, and P_{ka} is the number of adult residents in air quality grid cell k stratified into 5-year age bins. The program assigns the all-cause death rates for adults in county j to grid cell k using an area-weighting algorithm described in the BenMAP-CE user manual.[33] This health impact function returns a count of the number of $PM_{2.5}$-related deaths occurring in each county due to annual mean $PM_{2.5}$ concentrations. The function above can be generalized to the remaining $PM_{2.5}$ morbidity and ozone mortality and morbidity end points; when quantifying ozone-attributable premature deaths, we substituted a daily average mortality rate for the annual mortality rate noted above.

Our approach for specifying the health impact functions above is consistent with the methodology the U.S. EPA employed in the Regulatory Impact Analyses (RIAs) supporting the $PM_{2.5}$ and Ozone National Ambient Air Quality Standards (NAAQS).[34,35] These two RIAs considered evidence the Agency evaluated in the Integrated Science Assessments (ISAs) for Particulate Matter and Ozone. The ISAs systematically reviews the toxicological, epidemiological, and clinical evidence for each pollutant, carefully assessing the evidence before determining whether each pollutant is causally associated with a given health outcome. After identifying the

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human health end points as being either causally, or likely to be causally, associated with each pollutant, the RIA next evaluates the epidemiological studies quantifying these end points. As noted in the PM NAAQS RIA, the Agency "··· follow[s] a weight of evidence approach, based on the biological plausibility of effects, availability of concentration-response functions from well conducted peer-reviewed studies, cohesiveness of results across studies, and a focus on end points reflecting public health impacts···rather than physiological responses."[34] That RIA further specifies a host of criteria the Agency considers when selecting effect coefficients, including the study type, population attributes, pollutant measures, and other attributes.

To quantify PM-related premature deaths, we derived a long-term mortality β coefficient from a Hazard Ratio reported in the most recent extended analysis of the American Cancer Society (ACS) cohort (ages 30 and older) (β = 0.0058; SE = 0.000962) (Supporting Information Table S-1).[36] To estimate ozone-related premature deaths, we derive a short-term mortality β coefficient from an estimate of the percentage increase in the risk of ozone-related death from a multicity analysis (ages 0−99) (β = 0.00051; SE = 0.00012) (Supporting Information Table S-2).[37]

As noted below, the dollar value associated with the incidence of air pollution-related deaths is considerable, and so we searched the literature to identify alternative concentration−response parameters from more recently published epidemiological studies. We were unable to identify a long-term epidemiological study of $PM_{2.5}$ all-cause mortality for a representative U.S. cohort of both adult males and females that was more current than Krewski et al. (2009) .[36] However, as a sensitivity analysis, we also quantify risks using the hazard ratio from the extended analysis of the Harvard Six Cities study Lepuele et al. (2012); these results may be found in the Supporting Information (Table S-6).[38] We found that the Zanobetti & Schwartz (2008) ozone multicity study exhibited a number of strengths, including its evaluation of multiple exposure lags and its pooling of the single-city risk coefficients to derive a single national risk coefficient.[39] As a sensitivity analysis, we also report ozone-attributable premature deaths using the results of other broadly cited ozone mortality studies, including a multicity study (Table S-6).[40]

We performed a Monte Carlo-based simulation to construct an error distribution of estimated $PM_{2.5}$ and ozone-related effects. To inform the Monte Carlo simulation, we constructed a distribution around each effect (or, beta) coefficient using the standard error reported in each study; these resulting distributions are normally distributed (Table S-1). We calculated total numbers of premature deaths and illnesses in the contiguous U.S. for each year by summing the county-specific estimates, and report the sums of the 2.5th and 97.5th percentiles of the Monte Carlo distributions as 95% confidence intervals. As we note below, this distribution became an input to the Monte Carlo simulation we performed when quantifying a distribution of economic values. We use information regarding the distribution around each of the other input parameters (i.e., air quality, baseline incidence and population) and thus treated these parameters deterministically.

We defined m_{0ja} as the county-level age-stratified all-cause death rates from the Centers for Disease Control Wide-ranging Online Data for Epidemiologic Research database.[41] To account for the improved longevity of the population over time, we projected these death rates to future years using a life table reported by the U.S. Census Bureau (Supporting Information Tables S-3 and S-4). We defined the baseline incidence rates for the morbidity end points using rates of hospital admissions, emergency department visits and other outcomes for the year 2014 from the Healthcare Cost and Utilization Program (Supporting Information Table S-5). We defined P_{ka} using age-stratified population data from the U.S. Census Bureau. We projected population to year 2025 using an economic and demographic forecast from the Woods & Poole company.[42]

We calculated the fraction of all deaths due to $PM_{2.5}$ and ozone in each county and year using the following function:

$$AF_j = \frac{y_j}{\Sigma_a m0_{ja} \times P_{ja}} \quad (2)$$

where y_j is the estimated number of air pollution deaths, $m0_{ja}$ is the age-stratified baseline death rate, and, P_{ja} is the age-stratified population, respectively, in county j.

We calculated the population-weighted annual mean concentration for all counties combined (C) as

$$C = \frac{\sum_j C_j \times P_j}{P} \quad (3)$$

where C_j is the county-average $PM_{2.5}$ concentrations in county j, P_j is the population in county j, and P is the total population over all counties combined.

Estimating Economic Values of Air Pollution Effects. We estimate the economic value of the $PM_{2.5}$ and ozone-attributable premature deaths and illnesses on a per-ton of emissions basis using an approach that is consistent with the approaches used in the U.S. EPA's Ozone and PM NAAQS RIAs.[34] Those analyses applied a suite of willingness to pay (WTP) and cost of illness (COI) unit values built into the BenMAP-CE software that relate counts of adverse health outcomes to an estimated dollar value. A WTP measure describes the value that society places on avoiding some adverse health outcome. By contrast, COI reflects the direct costs associated with an adverse event; this can include medical expenses associated with a hospital visit and the value of lost productivity.

Because the value associated with air pollution-related premature deaths tends to account for as much as 99% of the total dollar value of a given air pollution health benefits assessment, it is worth detailing our method for valuing this end point. We apply a value of statistical life (VSL) to estimate the value of air pollution-related deaths. The VSL reflects the amount of money that a large number of people are willing to pay to reduce their risk of death by a small amount. As an example, 10 000 people might be willing to pay $500 to reduce their risk of death by 1-in-10 000; this yields a VSL of $5M. In this analysis, we apply a base VSL of $6.3 M in year 2000$ that is constant for all adult populations. This value is derived from a meta-analysis of 26 value of life studies published over a two-decade period.[43] While the number of publications reporting VSLs in the U.S. is quite large, we selected a value from this study because it has been applied extensively in the literature, making it easier to compare values in this manuscript to those published elsewhere.[2,6,44] The uncertainty around this mean value is represented by a Weibull distribution. We adjust this value in two ways. First, we inflate the VSL to year 2015$. Next, we account for the role of income growth in increasing future willingness to pay to reduce the risk of death by

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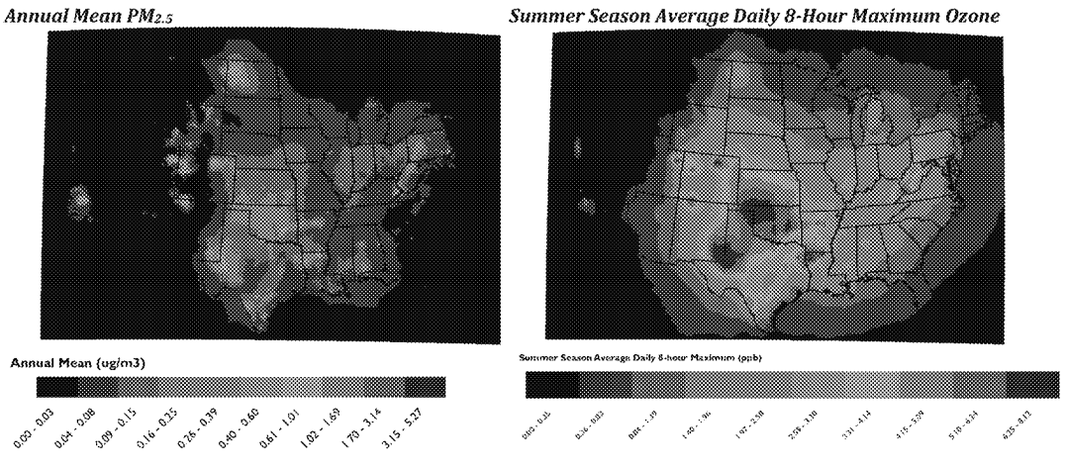

Figure 1. Annual Mean $PM_{2.5}$ and Summer Season Daily 8 h Maximum Ozone Attributable to the Oil and Natural Gas Sector in 2025. State and county boundaries drawn according to Census Topologically Integrated Geographic Encoding and Referencing (TIGER)/Line files in the ArcGIS software.

Table 2. Distribution of CAMx Model Predicted Annual Mean $PM_{2.5}$ and Summer Season 8-h Maximum Ozone Concentrations and Population-Weighted Levels for the Oil and Natural Gas Sector in 2025[a]

		percentile								
pollutant	min	10%	25%	50%	75%	90%	max	mean	SD	national population-weighted value
$PM_{2.5}$ (ug/m^3)	<0.01	0.0034	0.009	0.02	0.06	0.1	5.27	0.04	0.07	0.0557
SO_4	<0.01	0.001	0.004	0.008	0.016	0.03	0.55	0.013	0.015	0.02
NO_3	<0.01	<0.01	<0.01	<0.01	0.01	0.04	0.25	0.01	0.2	0.02
directly emitted $PM_{2.5}$	<0.01	<0.01	<0.01	<0.01	0.01	0.01	2	<0.01	0.02	<0.01
ozone (ppb)	<0.01	0.068	0.19	0.57	1.59	2.91	8.12	1.12	1.36	1.34
NO_x	<0.01	0.05	0.2	0.6	1.7	3	7.6	1.16	1.36	1.24
VOC	<0.01	<0.01	0.02	0.04	0.08	0.16	3.2	0.07	0.09	0.1

[a]Calculated from 12 × 12 km model predicted concentrations.

projecting the VSL to the year 2025. Adjusting the base VSL for these two factors yields a VSL of $10.4 M for the year 2025 in 2015$.

Benefit Per-Ton Calculation. We calculated the dollar per-ton for the contiguous United States BPT_i as

$$BPT_p = \frac{\sum_{bp}}{\text{emissions}_p} \quad (4)$$

where BPT_p is the dollar benefit per ton for a given $PM_{2.5}$ or ozone precursor, b is the total dollar benefits summed across all health end points for precursor p and emissions_p is the national sum of emissions for precursor p.

RESULTS

The CAMx model predicted annual mean $PM_{2.5}$ concentrations attributable to the sector ranging from a maximum of 5.27 $\mu g/m^3$ (located in western Colorado) to less than 0.001 μg/m3, with a median value of 0.04 $\mu g/m^3$ (Figure 1 and Table 2). States including Illinois, Ohio, and Pennsylvania in the east; Alabama, Louisiana, Oklahoma, and Texas in the south; North Dakota in the midwest; and Colorado and Wyoming in the west, experience the greatest $PM_{2.5}$ concentrations from the oil and natural sector (Figure 1). The predicted summer season average 8-h maximum ozone value ranges from a high of 8.12 ppb (located in Western Texas) to a low of 0.003 ppb, with a median value of 0.57 ppb (Figure 1 and Table 2). West Virginia in the east and Alabama, Louisiana, Nebraska, Oklahoma, and Texas in the south experience the greatest summer season ozone levels from this sector (Figure 1). The national population-weighted annual mean $PM_{2.5}$ value is about 0.05 $\mu g/m^3$ while the population-weighted summer season average 8 h maximum ozone value is 1.34 ppb (Table 2).

For the year 2025, we estimate 970 (95% confidence interval 670−1300) ozone-related premature deaths and 1000 (95% confidence interval 520−1400) $PM_{2.5}$-related deaths nationwide (Table 2). We also estimate about 1000 respiratory and cardiovascular hospital admissions, 3600 emergency department visits, tens of thousands of upper and lower respiratory symptoms, approximately 100 000 lost work days, and over a million cases of exacerbated asthma and acute respiratory symptoms (Table S-6). Because the air quality impacts from this sector are spatially heterogeneous, we also report state-by-state estimates of PM and ozone-related premature deaths. The PM and ozone-related mortality burden is the in Texas, Pennsylvania, Ohio, Oklahoma, Illinois, California, Michigan, Colorado, Indiana, and Louisiana (Table 3). To account for the role of population size in influencing these values, we also report the number of PM and ozone-related deaths per 100 000 people, finding that Oklahoma, Louisiana, Colorado, Pennsylvania and Indiana experience the largest number of deaths on a population-normalized basis (Figure 2). Estimated dollar values for these cases of premature death range from $13 to $28 billion and cases of illnesses range from $1 to $200 million depending on the end point; full results may be found in Supporting Information Table S-7.

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Table 3. National-Total and Selected State $PM_{2.5}$-and Ozone-Related Premature Deaths Attributable to Emissions from the Oil and Natural Gas Sector in 2025

	estimated numbers of premature deaths (95% confidence interval)[b]			
state[a]	attributable to $PM_{2.5}$	attributable to ozone	total deaths attributable to $PM_{2.5}$ and ozone	total deaths per 100 000 people
Texas	130 (88—170)	130 (70—190)	260 (160—370)	1.4
Pennsylvania	85 (57—110)	55 (30—80)	140 (87—190)	1.6
Ohio	65 (44—86)	48 (26—70)	110 (69—160)	1.5
Oklahoma	48 (32—63)	55 (29—81)	100 (62—140)	4.1
Illinois	55 (37—73)	38 (20—55)	92 (57—130)	1.1
California	59 (40—77)	14 (7.4—20)	72 (47—97)	0.27
Michigan	39 (26—52)	32 (17—47)	71 (44—98)	1.1
Colorado	37 (25—49)	34 (18—49)	70 (43—98)	1.9
Indiana	38 (26—50)	29 (15—42)	66 (41—92)	1.6
Louisiana	34 (23—45)	28 (15—40)	61 (38—85)	2
national total	1000 (670—1300)	970 (520—1400)	1900 (1100—2700)	0.9

[a]These states comprise the largest health impacts for the sector. States listed by descending order of total $PM_{2.5}$ and ozone-attributable deaths. [b]All values rounded to two significant figures.

We also estimate the national BPT values for PM and ozone precursors by dividing the total estimated benefits associated with each ozone precursor or PM species by the tons emitted of that precursor. Modeled precursors of PM elemental and primarily emitted organic carbon (EC/OC), SO_2, and oxides of nitrogen (NO_x), and NO_x and VOC precursors were modeled for ozone. For the purposes of estimating the incidence attributable to each PM species, we assume that each specie is as detrimental to health as total PM mass. The two largest BPT estimate ranges were for the PM precursors to EC/OC and sulfate, at $140,000–$320,000 and $27,000–$62,000, respectively (2015$ for all estimates); this range reflects the sum of the value of the morbidity end points and the long-term PM mortality coefficients from Krewski et al. 2009 at the low end and Lepeule et al. 2012 at the high end. The BPT ranges for the PM precursor to nitrate and the ozone precursor NO_x were of similar magnitudes, at $2,800–$6,300 and $4,600–$8,200, respectively. The range of economic value per ton of ozone-related VOC from the oil and natural gas sector was $300–$500; this range reflects the sum of the value of morbidity impacts and the Smith et al. 2009 ozone mortality risk coefficient at the low end and the Zanobetti & Schwartz 2008 risk coefficient at the high end.

DISCUSSION

The oil and natural gas sector emits pollutants that contribute to forming ozone and fine particles in the atmosphere, degrading air quality and ultimately adversely affecting public health in the form of premature deaths, hospital admissions, emergency department visits, cases of aggravated asthma, and lost days of school and work, among other outcomes.

While we were unable to identify other national-scale estimates of the air pollution impacts for this sector in the literature, we can place the estimates above in the context of analyses assessing the overall burden of $PM_{2.5}$ and ozone on health. The Global Burden of Disease study estimates about 100 000 $PM_{2.5}$ and ozone-related deaths in the United States for the year 2016.[4] A separate analysis of the U.S. reported about 130 000 $PM_{2.5}$ and ozone-related deaths for the year 2005.[45] The total number of oil- and natural gas-attributable $PM_{2.5}$ and ozone premature deaths represents a small fraction of the national burden these two analyses estimates. Because both the national burden analyses retrospectively estimate $PM_{2.5}$ and ozone-attributable deaths for 2010 and 2005, it is difficult to compare directly against these 2025-projected estimates. Moreover, neither national burden analyses reported state-by-state estimates of air pollution burden, which would arguably be a more relevant geographic unit of comparison for this sector, given the spatially heterogeneous air quality impacts from oil and natural gas facilities.

The results above indicate that the air quality and health impact associated with this sector correspond closely with the location of oil and natural gas facilities. Six states—Texas, Oklahoma, Colorado, North Dakota, West Virginia, and Pennsylvania—contributed almost 70% of the onshore natural gas production and over 74% of the onshore crude oil production in the lower 48 states in 2016.[46,47] These states also experience the highest levels of ground-level ozone and fine particle levels attributable to this sector. While the modeled ambient levels of fine particles are more spatially heterogeneous, ozone concentrations appear to be more spatially homogeneous across states including Nebraska, Oklahoma and Texas, suggesting a role for interstate transport. The estimated premature ozone and $PM_{2.5}$-related mortality corresponds well with the location of the air quality impacts. Indeed, in the western U.S., the sector tends to contribute $PM_{2.5}$ among locations in which fine particle levels are projected to be quite low—generally below about 6 $\mu g/m^3$. While we expect these areas to experience projected $PM_{2.5}$ levels well below the annual NAAQS of 12 $\mu g/m^3$, we quantify cases of excess $PM_{2.5}$-related premature deaths and illnesses in these locations because evidence suggests that there is no population-level concentration threshold for fine particles.

To our knowledge, this manuscript is the first reported benefit per-ton estimates for precursor emissions to $PM_{2.5}$ or ozone for the oil and natural gas sector derived from full-form photochemical grid modeling.[10] The $PM_{2.5}$-related health benefits of direct PM, sulfur dioxide (SO_2), and NO_x have previously been characterized for emission reductions from 17 industrial, area, and mobile emission sectors in the U.S. for the

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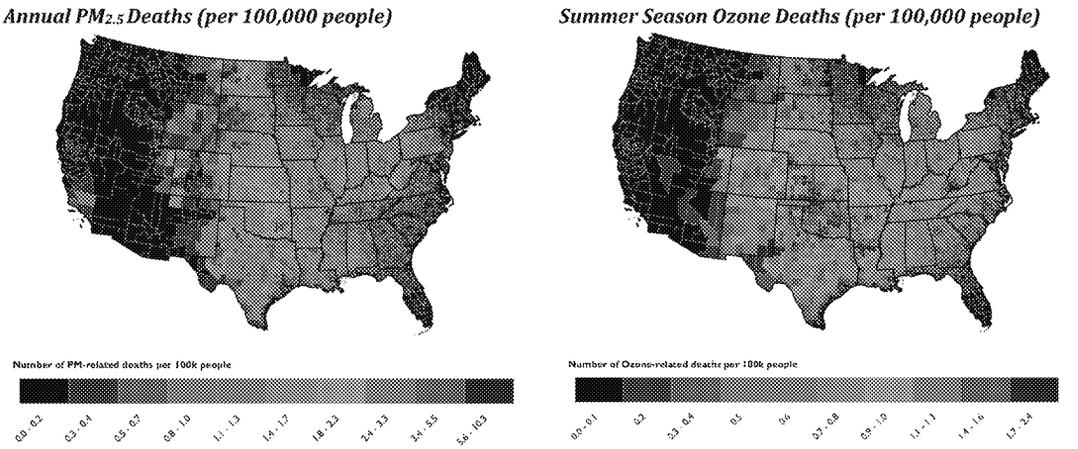

Figure 2. Premature Deaths (per 100 000 people) attributable to annual mean $PM_{2.5}$ and Summer season daily 8 h maximum ozone from the oil and natural gas sector in 2025. State and county boundaries drawn according to Census Topologically Integrated Geographic Encoding and Referencing (TIGER)/Line files in the ArcGIS software.

year 2016.[48] That manuscript published in 2012 did not quantify impacts from the oil and natural gas sector because of uncertainties associated with the 2005 emissions inventory for that sector. Direct PM BPT estimates for these 17 sectors range from $45,000–$490,000, which is comparable with our EC/OC BPT estimate of $140,000–$320,000. Similarly, our sulfate and nitrate BPT values ($27,000–$62,000 and $2,800–$6,300, respectively) fell within the range of SO_2 and NO_x BPT estimates for the 17 sectors ($12,000–$97,000 [with one exception: $400,000 for the iron and steel sector] and $1800–$16,000, respectively). As the BPT estimates presented here are comparable with previously published BPT values, we believe them to be reasonable.

Among all species and precursors considered in this study, the lowest BPT estimates were for VOC contributions to ozone formation (fewer than 100 deaths in 2025) than for NO_x (over 900 deaths each in 2025). In addition, there were considerably fewer restricted activity days, the health outcome with the second highest value, associated with VOC (under 170 000) than with NO_x (over 2 million). Another reason for less impact from VOC compared to NO_x is that most source areas tend to be located in places that are VOC-rich (also referred to as NO_x-sensitive) meaning that additional VOC has less impact than NO_x. This heterogeneity in ozone formation regime is reflected in the contribution results which is a strength of using a photochemical model to support ozone impact assessments.

Loomis and colleagues apply a suite of benefit per-ton values reported in the literature to quantify the air pollution impacts attributable to hydraulic fracturing in 14 states.[5,7,8] The authors calculate an average of these values, weighted according to whether the wells are located in urban or rural locations. The authors estimate the economic value of emissions from hydraulic fracturing of between $14 and $48B (2015$). Litovitz and colleagues quantify the economic value of air pollution impacts shale gas production in Pennsylvania, by employing the Air Pollution Experiments and Policy Analysis (APEEP) model.[7,11] This study estimates total damages of between $7.2 M and $32 M for Pennsylvania. While the present analysis did not report the total national economic value for the sector, multiplying the BPT values reported above against the sector emissions yields an estimate of between $13B to $29B, which is comparable to the value reported by Loomis et al.

Analyses of this scope and complexity are subject to important uncertainties and limitations. First, quantifying the air quality and health impacts for this sector is especially challenging because of uncertainties in the emission inventory for oil and natural gas production and transmission. These uncertainties can vary from basin to basin meaning that impacts in some areas may be better characterized than others depending on the level of effort provided by state and local agencies toward generating emissions and activity data for their particular area. The projected level of oil and natural gas production in 2025 is also sensitive to the price of oil in that year, which we cannot account for completely in this analysis. Further, uncertainties in the assumed composition of VOC emissions can be important, especially if the currently assumed composition is biased low for highly reactive VOC meaning less potential to facilitate ozone formation. We modeled an emissions inventory that was the best available at the time of the analysis and itself represented substantial improvements over previous inventories. Another uncertainty associated with quantifying an ozone-related BPT value in particular is that ozone-related impacts are sensitive to baseline levels of VOC and NO_x. These levels differ by location and are not assumed to change over time as these baseline pollutant levels change. Similarly, $PM_{2.5}$ impacts are sensitive to baseline levels of ammonia and in the case of nitrate ion also to favorable weather conditions (e.g., cool temperatures and higher relative humidity). $PM_{2.5}$ impacts from this sector are likely under-represented to some degree since impacts on SOA were not quantified. VOC emissions from this sector (e.g., aromatics) are known to form SOA and the NO_x emissions in proximity to biogenic VOC may also contribution to SOA formation.[49,50]

To the extent that future populations are healthier and more resilient to air pollution than we have forecast in this analysis, and thus more resilient to air pollution, then the BPT values may be overstated. The Monte Carlo analysis described above accounts only for the statistical uncertainty associated with the pollutant effect coefficients and economic unit values; it does not account for a host of other uncertainties associated with the emissions inventory, air quality modeling, baseline health or demographic information. Finally, the estimates of economic value are sensitive to the VSL that we applied;

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using a different VSL might increase or decrease the values reported here.

These uncertainties notwithstanding, we believe the manuscript provides important insight to the heath burden associated with oil and natural gas production in the U.S. This manuscript is the first to estimate the benefits of reducing emissions from this sector on a per-ton basis using full-form modeling; these values may be useful to those evaluating air quality management policies affecting this sector.

■ ASSOCIATED CONTENT

Supporting Information

The Supporting Information is available free of charge on the ACS Publications website at DOI: 10.1021/acs.est.8b02050.

Additional details regarding: our approach for estimating population exposure and the health impact functions we applied(PDF)

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Notes

The authors declare no competing financial interest.

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The views in this manuscript are those of the authors alone and do not necessarily reflect the policy of the U.S. Environmental Protection Agency. The EPA does not endorse any products or commercial services mentioned in this publication.

■ ABBREVIATIONS

BenMAP	environmental Benefits Mapping and Analysis Program
CAMx	Comprehensive Air Quality Model with extensions
EPA	Environmental Protection Agency
ICD	International Classification of Disease
MATS	Mercury and Air Toxics Standards
NAAQS	National Ambient Air Quality Standards
O_3	Ground-level ozone
$PM_{2.5}$	Particulate matter, 2.5 μm or less in diameter
RRF	Relative Response Factor
WHO	World Health Organization

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Appointment

From: Atkinson, Emily [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=BB2155ADEF6A44AEA9410741F0C01D27-ATKINSON, EMILY]
Sent: 12/12/2017 1:34:38 PM
To: Dunham, Sarah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a9444681441e4521ad92ae7d42919223-SDUNHAM]; Gunning, Paul [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=f65040017f05429aa05572f096a50463-PGUNNING]; Tsirigotis, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d19c179f3ccb4fadb48e3ae85563f132-PTSIRIGO]; Page, Steve [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=269c9581404542e79501f2bf0379a2ad-SPAGE]; Cozzie, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ee8c3582a39d4d81ac38f29a2b3abb2d-DCOZZIE]; Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Harnett, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=437834c4b30541d2beb0386cc3d0e253-WHARNETT]

Subject: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Attachments: FW: Meeting Request for Shell from S. Fotis; Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis; RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis
Location: WJC-N 5400

Start: 12/13/2017 4:00:00 PM
End: 12/13/2017 4:45:00 PM
Show Time As: Tentative

To: Bill Wehrum, Mandy Gunasekara, David Harlow, Sarah Dunham, Paul Gunning, Peter Tsirigotis, Steve Page, David Cozzie, Mike Koerber; Harnett, Bill

Outside Attendees (in person):

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman


FW: Meeting Request for Shell...


Confirmed 12/13 at 11am: Meeting R...


RE: Confirmed 12/13 at 11am: ...

Message

From: Lewis, Josh [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B22D1D3BB3F84436A524F76AB6C79D7E-JOLEWIS]
Sent: 9/6/2018 7:35:10 PM
To: Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]
CC: Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]
Subject: FW: Oil & Gas Reconsideration ROCIS Files
Attachments: EO12866_Oil and Gas Reconsideration 2060-AT54 NPRM_20180906.docx; EO12866_Oil and Gas Reconsideration 2060-AT54 NPRM RIA_20180906.docx; EO12866_Oil and Gas Reconsideration2060-AT54 NPRM TSD_20180906.docx

Importance: High

Sending this your way in case you want to see/review final O&G files…

From: Rush, Alan
Sent: Thursday, September 06, 2018 3:08 PM
To: Brown, Stephanie N. <Brown.StephanieN@epa.gov>
Cc: Adams, Darryl <Adams.Darryl@epa.gov>; Wiggins, Lanelle <Wiggins.Lanelle@epa.gov>; Gilbreath, Jan <Gilbreath.Jan@epa.gov>; Henigin, Mary <Henigin.Mary@epa.gov>; Iglesias, Amber <Iglesias.Amber@epa.gov>; Lewis, Josh <Lewis.Josh@epa.gov>; Atkinson, Emily <Atkinson.Emily@epa.gov>; Mcquilkin, Wendy <Mcquilkin.Wendy@epa.gov>; Morgan, Ruthw <morgan.ruthw@epa.gov>
Subject: FW: Oil & Gas Reconsideration ROCIS Files
Importance: High

Stephanie,

As I said on the phone, attached are the final Oil & Gas Reconsideration OMB files for upload into ROCIS. They include the NPRM, RIA and the TSD. Chad has approved and opened ROCIS.

See Chad's instructions in yellow highlight concerning the ROCIS economic data below.

From: Whiteman, Chad S. EOP/OMB EOP / Ex. 6
Sent: Thursday, September 06, 2018 2:19 PM
To: Marsh, Karen <Marsh.Karen@epa.gov>
Cc: Fruh, Steve <Fruh.Steve@epa.gov>; Hambrick, Amy <Hambrick.Amy@epa.gov>
Subject: RE: EO 12866 Comments on EPA Oil and Gas Reconsideration NPRM 2060-AT54

Hi Karen,
The preamble version you just sent looks good as well as the final clean version of the RIA and TSD. Please ask OP to upload the rule document, RIA, and the TSD (as a supplementary document). Below are my recommendations for OP for what to include in the economic data in ROCIS.

ROCIS is open for agency amendment.
Thanks,
Chad

For the ROCIS economic data, here are my recommendations:

Deliberative Process / Ex. 5

Message

From: Tsirigotis, Peter [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D19C179F3CCB4FADB48E3AE85563F132-PTSIRIGO]
Sent: 7/6/2018 9:16:27 PM
To: Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]
CC: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]
Subject: OAQPS.Status of projects.
Attachments: OAQPS.Status of projects.7.6.18 .docx; ATT00001.txt

Hi everyone. FYI, I shared the attached with Bill earlier today. Have a great weekend!

Message

From: Stephen Fotis [scf@vnf.com]
Sent: 12/18/2017 2:38:59 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]
CC: Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]
Subject: Follow-up to Shell Meeting

Bill – I just wanted to thank you and your team for meeting with Shell last week. It was very helpful for Shell to have the opportunity to present directly to you its issues and priorities regarding Subpart OOOOa and other air regulatory matters of importance to the company. Shell very much wants to work collaboratively with you and the agency on these matters and believes that the meeting was very helpful step to them in doing so. Please let us know if there are ways that Shell might support you and your efforts.
I hope that you get some time off for the holidays and look forward to working with you and your team in the new year.
Best,
Stephen

Stephen Fotis
Partner
Van Ness Feldman LLP
scf@vnf.com
(202) 298-1908

Message

From: Lewis, Josh [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B22D1D3BB3F84436A524F76AB6C79D7E-JOLEWIS]
Sent: 4/20/2018 7:41:44 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]
CC: Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]; Wright, Rhonda [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5d6d041a34ea466dac1f7985308e35ea-RWRIGH04]
Subject: For Review: (SAN 5719.8) - Oil & Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration (NPRM)(OMB)
Attachments: O&G Reconsideration Post-It Note.pdf; EO12866_Oil and Gas Reconsideration 2060-AT54 NPRM 20180419.docx; EO12866_Oil and Gas Reconsideration 2060-AT54 RIA 20180419.docx

Importance: High

This package arrived today in the IO for review. I'll bring the hard copy to Monday's morning meeting but sending now in case you want to get a head start on review.

Josh

Appointment

From: Loving, Shanita [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=439CE9C2D2104080A1B5908D3402BF20-LOVING, SHANITA]
Sent: 12/13/2017 2:12:24 PM
To: Dunham, Sarah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a9444681441e4521ad92ae7d42919223-SDUNHAM]; Gunning, Paul [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=f65040017f05429aa05572f096a50463-PGUNNING]; Tsirigotis, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d19c179f3ccb4fadb48e3ae85563f132-PTSIRIGO]; Page, Steve [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=269c9581404542e79501f2bf0379a2ad-SPAGE]; Cozzie, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ee8c3582a39d4d81ac38f29a2b3abb2d-DCOZZIE]; Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Harnett, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=437834c4b30541d2beb0386cc3d0e253-WHARNETT]; Woods, Clinton [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]

Subject: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Attachments: FW: Meeting Request for Shell from S. Fotis; Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis; RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis
Location: WJC-N 5400 + Video with OAQPS

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Tentative

To: Bill Wehrum, Mandy Gunasekara, David Harlow, Sarah Dunham, Paul Gunning, Peter Tsirigotis, Steve Page, David Cozzie, Mike Koerber; Harnett, Bill; Woods, Clint

Outside Attendees (in person):

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman


FW: Meeting Request for Shell...


Confirmed 12/13 at 11am: Meeting R...


RE: Confirmed 12/13 at 11am: ...

Appointment

From: Lewis, Josh [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B22D1D3BB3F84436A524F76AB6C79D7E-JOLEWIS]
Sent: 12/13/2017 12:33:12 PM
To: Dunham, Sarah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a9444681441e4521ad92ae7d42919223-SDUNHAM]; Gunning, Paul [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=f65040017f05429aa05572f096a50463-PGUNNING]; Tsirigotis, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d19c179f3ccb4fadb48e3ae85563f132-PTSIRIGO]; Page, Steve [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=269c9581404542e79501f2bf0379a2ad-SPAGE]; Cozzie, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ee8c3582a39d4d81ac38f29a2b3abb2d-DCOZZIE]; Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Harnett, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=437834c4b30541d2beb0386cc3d0e253-WHARNETT]; Woods, Clinton [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]

Subject: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Attachments: FW: Meeting Request for Shell from S. Fotis; Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis; RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis
Location: WJC-N 5400

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Tentative

To: Bill Wehrum, Mandy Gunasekara, David Harlow, Sarah Dunham, Paul Gunning, Peter Tsirigotis, Steve Page, David Cozzie, Mike Koerber; Harnett, Bill; Woods, Clint

Outside Attendees (in person):

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman


FW: Meeting Request for Shell...


Confirmed 12/13 at 11am: Meeting R...


RE: Confirmed 12/13 at 11am: ...

Message

From: Koerber, Mike [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=9C513901D4FD49F9AB101A6F7A7A863E-KOERBER, MIKE]
Sent: 12/3/2018 6:27:45 PM
To: OAR Briefings [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2da922b09b7a4a18a19571005bff0297-OAR Briefin]
CC: McKinney, Voronina [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=McKinney, Voronina]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]
Subject: BRIEFING MATERIALS: Meeting: IPAA PLEASE DO NOT POST OR DISTRIBUTE IN MEETING ROOM
Attachments: IPAA12.04.18finalmeeting.docx

Attached please find materials for the following meeting with Mandy on Tuesday, December 4:

1:00 – 1:30 pm Meeting: IPAA

These materials are internal documents – not to be distributed in meeting room.

Message

From: Ward, Hillary [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=43FD96E0B15A4D52BD61F7E25EFD3CCD-HWARD]
Sent: 3/8/2019 3:55:56 AM
To: OAR Briefings [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=2da922b09b7a4a18a19571005bff0297-OAR Briefin]
CC: Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; McKinney, Voronina [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=McKinney, Voronina]
Subject: Materials: Meeting with BP & Shell re: Oil & Gas Methane rule
Attachments: BPShellWehrum_3.8.2019_final.docx

Please see the attached background materials for the following meeting:

3/8/19, 1:00-1:45, Meeting with BP & Shell re: Oil & Gas Methane rule

Hillary Ward
USEPA, Office of Air Quality Planning and Standards
(919)541-3154

Message

From: Harlow, David [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B5A9A34E31FC4FE6B2BEADDDA2AFFA44-HARLOW, DAV]
Sent: 4/3/2019 12:09:05 PM
To: Idsal, Anne [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b1beca8121fb47a08e82b6bf2247a79b-Idsal, Anne]; Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Ward, Hillary [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=43fd96e0b15a4d52bd61f7e25efd3ccd-HWARD]
CC: Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; McKinney, Voronina [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=McKinney, Voronina]
Subject: FW: Materials: 4/3 David H meeting w/Shell - DO NOT POST OR DISTRIBUTE IN MEETING ROOM
Attachments: Shell 4.3.19.docx

Hillary,

Just fyi, although the initial request had come to me, I've punted this meeting with Shell over to Clint. And I believe that Anne, our new Principal Deputy Assistant Administrator, may also be attending. So I'm taking the liberty of forwarding the background paper to both of them. Thank you.

David S. Harlow
Senior Counsel
Immediate Office of the Assistant Administrator
Office of Air and Radiation, USEPA
WJC-N Room 5409K
1200 Pennsylvania Avenue NW
Washington, DC 20460
202-564-1233
Harlow.David@epa.gov

From: Ward, Hillary
Sent: Wednesday, April 3, 2019 7:37 AM
To: OAR Briefings <OAR_Briefings@epa.gov>
Cc: Koerber, Mike <Koerber.Mike@epa.gov>; McKinney, Voronina <mckinney.voronina@epa.gov>
Subject: Materials: 4/3 David H meeting w/Shell - DO NOT POST OR DISTRIBUTE IN MEETING ROOM

Hello,

Please see the attached background pager for David Harlow's meeting with Shell. This pager is an internal document – not to be distributed in meeting room.

Thanks,

Hillary Ward
USEPA, Office of Air Quality Planning and Standards
(919)541-3154

Message

From: Harlow, David [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B5A9A34E31FC4FE6B2BEADDDA2AFFA44-HARLOW, DAV]
Sent: 11/9/2018 2:07:57 PM
To: Lubetsky, Jonathan [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=e125d09a658e48119789ccae5712b4a5-JLUBETSK]
CC: Mroz, Jessica [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=64b0c7f807df436a9b40ce52f7dec34c-Mroz, Jessi]
Subject: RE: Purifoy, Tiffany shared the folder "EPA-HQ-2017-003014-Oil and Gas ICR" with you.

Jonathan,

I've now finished my review of this production set. All seems to be in order. Thank you.

David S. Harlow
Senior Counsel
Immediate Office of the Assistant Administrator
Office of Air and Radiation, USEPA
WJC-N Room 5409K
1200 Pennsylvania Avenue NW
Washington, DC 20460
202-564-1233
Harlow.David@epa.gov

From: Lubetsky, Jonathan
Sent: Thursday, November 8, 2018 8:21 AM
To: Harlow, David <harlow.david@epa.gov>
Cc: Mroz, Jessica <mroz.jessica@epa.gov>
Subject: FW: Purifoy, Tiffany shared the folder "EPA-HQ-2017-003014-Oil and Gas ICR" with you.

David,
We have another set of documents for your review for the Oil and Gas FOIA. Could you please review the documents in the folder on onedrive below?
Thank you,
Jonathan

Please circulate for awareness the enclosed final response to the Oil and Gas ICR request. Access to this folder has been granted to the awareness reviewers.

The requested deadline for response is November 14, 2018.

Sincerely,

Tiffany Purifoy

This link only works for the direct recipients of this message.

EPA-HQ-2017-003014-Oil and Gas ICR

Open

Message

From: Harlow, David [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B5A9A34E31FC4FE6B2BEADDDA2AFFA44-HARLOW, DAV]
Sent: 3/25/2019 9:53:06 PM
To: Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]
CC: Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]; Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]; Lewis, Josh [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b22d1d3bb3f84436a524f76ab6c79d7e-JOLEWIS]
Subject: Re: Shell Meeting Request on OOOOa Rulemaking

Emily,

That's great, thank you.

Sent from my iPhone

On Mar 25, 2019, at 2:26 PM, Atkinson, Emily <Atkinson.Emily@epa.gov> wrote:

> Absolutely David. I will check in with Clint on this and if appropriate work with Josh and Delaney to take steps to get this setup for IO staff.
>
> **From:** Harlow, David
> **Sent:** Monday, March 25, 2019 2:22 PM
> **To:** Atkinson, Emily <Atkinson.Emily@epa.gov>
> **Cc:** Woods, Clint <woods.clint@epa.gov>; Dominguez, Alexander <dominguez.alexander@epa.gov>
> **Subject:** Fwd: Shell Meeting Request on OOOOa Rulemaking
>
> Emily,
>
> My apologies foisting this on you, but if you have the opportunity, would you be so kind as to touch base
>
> **Deliberative Process / Ex. 5**
>
> Thank you.
>
> Sent from my iPhone
>
> Begin forwarded message:
>
> > **From:** Stephen Fotis <scf@vnf.com>
> > **Date:** March 25, 2019 at 10:36:50 AM EDT

To: "harlow.david@epa.gov" <harlow.david@epa.gov>
Subject: Re: Shell Meeting Request on OOOOa Rulemaking

Hi David
Can you please respond to my emails and calls about scheduling a brief meeting with Shell on the OOOOa rule? I hope you're okay given that it is uncharacteristic for you to not provide any response.
Thanks
Stephen

On Mar 21, 2019, at 1:17 PM, Stephen Fotis <scf@vnf.com> wrote:

> Hi David – I am following up on my voice message about finding a time to meet with Shell during the week of April 1-5 on the OOOOa rule. Several folks from Shell will be in town that week and would like to have the opportunity to discuss Shell's views on a short list of priority issues. We can be flexible on the timing. If you need to talk or have questions, please call my cell at 402.413-2321.
> Many Thanks,
> Stephen
>
> ---
>
> **From:** Stephen Fotis
> **Sent:** Sunday, March 17, 2019 4:42 PM
> **To:** harlow.david@epa.gov
> **Subject:** Shell Meeting Request on OOOOa Rulemaking
>
> David – On behalf of Shell, I would like to meet with you, along with the appropriate EPA staff, on several key technical issues relating to the proposed Subpart OOOOa "technical fix" rule that EPA issued last year and is currently pending before the Agency. Several key Shell representatives would be available to meet in your offices with you and your staff, with any other OAQPS staff in North Carolina would participate by telephone. We would like to schedule the meeting for some time during the first week of April (*i.e.,* April 1-5) if that is possible on your end.
> If you have questions or need additional information, please don't hesitate to give me a call or send an email.
> Many thanks and hope that you're doing well.
> Best,
> Stephen
>
> Stephen Fotis
> Partner
> Van Ness Feldman LLP
> scf@vnf.com
> (202) 298-1908
>
>

notify the sender immediately by telephone (202-298-1800) or by return e-mail and delete it from his or her computer.

Appointment

From: Atkinson, Emily [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=BB2155ADEF6A44AEA9410741F0C01D27-ATKINSON, EMILY]
Sent: 11/30/2017 7:31:28 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Dunham, Sarah [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=a9444681441e4521ad92ae7d42919223-SDUNHAM]; Gunning, Paul [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=f65040017f05429aa05572f096a50463-PGUNNING]; Tsirigotis, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d19c179f3ccb4fadb48e3ae85563f132-PTSIRIGO]; Page, Steve [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=269c9581404542e79501f2bf0379a2ad-SPAGE]; Cozzie, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=ee8c3582a39d4d81ac38f29a2b3abb2d-DCOZZIE]; Koerber, Mike [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=9c513901d4fd49f9ab101a6f7a7a863e-Koerber, Mike]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Harlow, David [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b5a9a34e31fc4fe6b2beaddda2affa44-Harlow, Dav]; Harnett, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=437834c4b30541d2beb0386cc3d0e253-WHARNETT]; Woods, Clinton [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]
CC: Dominguez, Alexander [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5ced433b4ef54171864ed98a36cb7a5f-Dominguez,]

Subject: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Attachments: FW: Meeting Request for Shell from S. Fotis; Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis; RE: Confirmed 12/13 at 11am: Meeting Request for Shell from S. Fotis
Location: WJC-N 5400 + Video with OAQPS

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Busy

To: Bill Wehrum, Mandy Gunasekara, David Harlow, Sarah Dunham, Paul Gunning, Peter Tsirigotis, Steve Page, David Cozzie, Mike Koerber; Harnett, Bill; Woods, Clint

Outside Attendees (in person):

- Sara Glenn, Director, Federal Government Relations and Senior Counsel, Upstream
- Marnie Funk, Director on Environmental Matters
- Kristin Whitman, Senior Advisor, Government Relations
- Stephen Fotis, Van Ness Feldman


FW: Meeting Request for Shell...


Confirmed 12/13 at 11am: Meeting R...


RE: Confirmed 12/13 at 11am: ...

Message

From: DeLuca, Isabel [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=0B021C30CBEE4637A7C7CA683E5E044A-IDELUCA]
Sent: 8/10/2018 5:43:35 PM
To: Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]; Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Woods, Clint [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bc65010f5c2e48f4bc2aa050db50d198-Woods, Clin]
Subject: oil and gas comms
Attachments: Draft press release v2.docx; DRAFT.INTERNAL.OG Technical Proposal.Comms Plan v7.docx; DRAFT.O&G 2018 proposed technical amendments.FS. v4.docx

Hi all,
Attached are the draft materials for the oil and gas technical amendments proposal: draft press release, rollout plan, and fact sheet. The press release is pretty dry – there is a placeholder for a quote.

You'll see the fact sheet is very long. There's an overview on the first page, followed by several pages with details about the rule. If desired, we could break out the overview into a 1-pager, and have a separate fact sheet with the details.

I'll send draft power plant replacement rule docs before 3.

Thanks,
Isabel

Isabel DeLuca
Office of Air and Radiation, US EPA
(202) 343-9247

Matthew Todd
Senior Policy Advisor

Regulatory and Scientific Affairs

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Washington, DC 20005-4070
USA
Telephone 202-682-8319
Email toddm@api.org
www.api.org

July 2, 2018

Via Electronic Mail (Chapman.apple@epa.gov)

Apple Chapman
Deputy Director, Air Enforcement Division
U.S. Environmental Protection Agency
Mail Code 2242A
1200 Pennsylvania Avenue, N.W.
Washington, DC 20460

Re: Comments of the American Petroleum Institute in Response to the Environmental Protection Agency's Draft Audit Policy Agreement for New Owners of Oil and Natural Gas Exploration and Production Facilities.

Dear Deputy Director Chapman:

This letter provides comments from the American Petroleum Institute ("API") in response to the U.S. Environmental Protection Agency's ("EPA's" or "the Agency's") request for comments on its proposed changes to EPA's 2000 policy titled "Incentives for Self-Policing: Discovery, Disclosure, Correction and Prevention of Violations" (the "Audit Policy") for new owners of oil and natural gas exploration and production facilities and, in particular, the Agency's Draft Standard Audit Policy Agreement ("Draft Agreement"). API believes that the Audit Policy is an important tool in furtherance of environmental compliance and appreciates EPA's interest in expanding its use by proposing to adopt a more flexible approach to eligibility and administration.

EPA is correct that the Audit Policy has traditionally been underutilized by new owners of oil and natural gas exploration and production facilities and has correctly identified many of the reasons why new owners of oil and natural gas exploration and production facilities have not used the Audit Policy as extensively as other industries (*e.g.*, infeasibility of deadlines, regulatory complexity). API is concerned, however, that the approach embodied in EPA's Draft Agreement may not only fail to address these issues, it could potentially create new barriers to use of the Audit

Policy. API raised these concerns and questions with EPA in advance of, and during, EPA's stakeholder meeting on June 28, 2018. We are reiterating these concerns here in sincere hope that we will be able to work with EPA to avoid the inadvertent imposition of additional barriers to use of the Audit Policy. API and its members are committed to helping EPA expand use of the Audit Policy among new owners of oil and natural gas exploration and production facilities.

I. CONCERNS WITH EPA'S PROPOSED APPROACH

API has two fundamental concerns with EPA's proposed changes to the Audit Policy. Our first concern relates to Draft Policy Agreement ("Attachment B"), which appears to require companies seeking penalty mitigation through the Audit Policy to first conduct analyses and corrective actions that are not based on any federal statutory or regulatory requirements. The Attachment B requirements are, in fact, significantly more stringent than what EPA requires under regulations promulgated pursuant to the Clean Air Act ("CAA" or "the Act").

Our second concern is with EPA's apparent intent to require new owners to navigate EPA's audit process in states that operate their own audit programs pursuant to authority delegated under the CAA. Rather than deferring to states authorized to administer the Act, EPA's proposed approach suggests that EPA will impose its own Audit Policy requirements on top of any state audit program requirements. API is concerned that this approach would lead to duplication, inconsistency, and confusion.

More fundamentally, both of these proposed changes appear more likely to further curtail – rather than expand – use of the Audit Policy by new owners of oil and natural gas exploration and production facilities. In order to help EPA avoid such an undesirable outcome, in the subsections below, we provide detailed explanations of API's concerns and recommended changes.

a. Attachment B Creates a Barrier to Use of the Audit Policy

EPA's 2000 Audit Policy encourages companies to voluntarily discover potential violations through self-auditing, disclose them to the EPA, promptly correct them, and prevent their future reoccurrence. In exchange, companies receive a reduction or elimination of civil penalties and a determination by EPA not to recommend criminal prosecution to the U.S. Department of Justice.

In order to obtain penalty mitigation through the audit policy, nine conditions must be met: (1) systematic discovery through an internal or external audit or compliance management program; (2) voluntary discovery of the violation; (3) prompt disclosure to EPA within 21 days of discovery; (4) independent discovery and disclosure; (5) correction and remediation within 60 days from the date of discovery; (6) prevention of recurrence of the violation; (7) the violations are not repeat violations; (8) the violations do not result in serious actual harm, an imminent and substantial

endangerment, and do not violate an administrative or judicial order or consent agreement; and (9) cooperation by the disclosing entity.

In 2008, EPA tailored its approach to Audit Policy disclosures for "new owners." EPA recognized that environmental audits frequently occur as part of a transfer of ownership over a property or facility. New owners, however, did not sufficiently avail themselves of the program because of uncertainty over EPA's definition of "new owners," apparent inapplicability of some of the policy's conditions, and deadlines that were too short to be used in the context of a transaction. EPA's 2008 Interim Approach to Applying the Audit Policy to New Owners ("Interim Policy") attempted to address these issues by clarifying the eligibility for treatment as a new facility and by clarifying how four of nine Audit Policy eligibility preconditions were to be applied to new owners.[1]

The Interim Policy's specific changes to the Audit Policy's eligibility conditions are not relevant to these comments. What is relevant, however, is that the Interim Policy did not change the fundamental structure of the Audit Policy. Under either the original 2000 Audit Policy or the 2008 Interim Policy, companies are required to discover violations through self-auditing, disclose them to the EPA, promptly correct them, and prevent their future reoccurrence. In order to identify potential violations, the participating company first identifies the standards and requirements applicable to the subject facility and then examines the facility and the company's operation of the facility to assess whether those standards and requirements have been met.

The Draft Agreement, on the other hand, would fundamentally change the structure of the Audit Policy by requiring auditing, disclosure, and corrective actions regardless of whether the company is in violation of any federal regulation under the CAA. To be perfectly clear, this approach would saddle new owners of oil and natural gas exploration and production facilities with an entirely new and onerous requirement in order to use the Audit Policy. Under proposed Attachment B, it would no longer be sufficient for new owners to identify, disclose, correct, and prevent recurrence of "specific violations."[2] Instead, Attachment B would require new owners to conduct modeling, install equipment, and adopt operational and design changes even where the design and operation of the equipment complies with the New Source Performance Standards ("NSPS") and National Emissions Standards for Hazardous Air Pollutants ("NESHAPs") EPA promulgated for that equipment.

Indeed, Attachment B seems to provide a framework for assessing the presence of emissions and the efficacy of emissions controls without identifying the applicable standards for either. In doing

[1] 73 Fed. Reg. 44,991 (August 1, 2008).
[2] See #4 in Audit Policy Interpretive Guidance (Jan. 1997) at https://www.epa.gov/sites/production/files/documents/audpolintepgui-mem.pdf

so, Attachment B seemingly creates an entirely new standard of compliance that does not bear any relationship to any federal statutory or regulatory requirement applicable to oil and natural gas exploration and production facilities. Instead, the Draft Agreement appears to require participating companies to conduct assessments and corrective actions that are required only under certain state regulations, and/or have been compelled in EPA consent decrees alleging subjective "general duty" violations under CAA Section 112(r)(1). Such assessments and corrective actions may be appropriate in specific states or in certain fact-specific circumstances, but it is not appropriate to require them on an industry-wide basis. While API recognizes that EPA is not attempting to craft new non-regulatory compliance standards for oil and natural gas exploration and production facilities, we remain concerned that Attachment B seems to provide a new industry-wide measurement of compliance that far exceeds what is required under the CAA or EPA's regulations under the CAA.

API also recognizes that the Draft Agreement is designed to provide model language that can be tailored by participating companies and the Agency as they negotiate the provisions of specific audit agreements. Nevertheless, given the Agency's superior leverage in negotiating an audit agreement with a company concerned about potential noncompliance, API remains concerned that putative participants in the Audit Program would not be able to negotiate away EPA's default requirements. Again, API does not believe that EPA is attempting to use the Draft Agreement to introduce a backdoor regulation on the upstream oil and natural gas industry. We do, however, have significant questions about the propriety of assessing compliance based on standards that exceed and are entirely distinct from that which EPA has required in regulations developed through notice-and-comment rulemaking.

The Audit Policy is intended to provide incentives to voluntarily identify and disclose violations of statutory and regulatory requirements. Structuring the Audit Program such that noncompliance with voluntary standards, individual state requirements, subjective general duties, or the terms of a single company's consent agreement are considered "violations," however, creates an intensely problematic implication that EPA is creating a new, more stringent compliance standard through enforcement leverage.

i. Questions About Attachment B

As we have elsewhere stated, API is committed to working with EPA to better understand and improve the Agency's proposed approach. In order to hopefully continue our dialogue with EPA, API is herein identifying the following important questions:

- Why did EPA not base Attachment B on existing federal regulatory requirements?

- Why does EPA believe that the analyses and corrective actions outlined in Attachment B should be required to demonstrate compliance and receive penalty mitigation?
- With what regulation/requirement does Attachment B attempt to measure compliance?
- Does Attachment B reflect an effort to treat generalized and subjective requirements under the CAA Section 112(r)(1) as specific regulatory comments?
- Would Attachment B be used in an enforcement action to demonstrate either an industry-recognized "good air pollution control practice" or a standard necessary to prevent or minimize hazards?
- Is Attachment B intended to help protect companies from future enforcement actions alleging noncompliance with generalized duties under CAA Section 112(r)(1) or otherwise?
- In what way does Attachment B promote EPA's stated goal of expanding use of the Audit Policy new owners in the oil and natural gas exploration and production facilities?
- Which precise types of violations must be corrected in 60-days and which are subject to a negotiated schedule?

ii. Recommendation for Addressing Concerns with Attachment B

Attachment B imposes assessment and corrective action requirements that bear no relationship to federal regulations promulgated under the CAA. As such, we recommend that EPA decline to finalize Attachment B and refrain from requiring new owners of oil and natural gas exploration and production facilities to undertake non-regulatory measures in order to avail themselves of potential penalty mitigation under the Audit Policy.

We do not believe that new owners of oil and natural gas exploration and production facilities have underutilized the Audit Policy based on difficulties in identifying the federal regulatory requirements on which to assess their compliance. These requirements are found within a handful of NSPS and NESHAPs and readily identifiable. Identifying them in a model agreement does not save time or ease administration of the Audit Program and would only lead to confusion. To the extent that regulatory applicability becomes complex, that complexity is largely driven by differences in regulations based on jurisdiction or local air quality. This variability is part of the CAA and is not an issue that can, or should, be addressed through the Audit Policy. As such, we do not believe that EPA should provide a new draft agreement to replace Attachment B.

If, however, EPA is committed to providing an amended Attachment B, the Agency should base that document exclusively on federal CAA regulations promulgated for those sources. EPA's

proposed amendments to the National Oil and Natural Gas Federal Implementation Plan ("FIP") for Indian Country provides a comprehensive list of those requirements.[3] We have reproduced the relevant table from the preamble for those proposed FIP amendments.

40 CFR part and subpart	**Title of subpart**	**Potentially affected sources in the oil and natural gas production and natural gas processing segments of the oil and natural gas sector**
40 CFR part 63, subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters	Process heaters
40 CFR part 63, subpart ZZZZ	Subpart ZZZZ—National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines	Reciprocating Internal Combustion Engines
40 CFR part 60, subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines	Compression Ignition Internal Combustion Engines
40 CFR part 60, subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	Spark Ignition Internal Combustion Engines
40 CFR part 60, subpart Kb	Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	Fuel Storage Tanks

[3] 83 Fed. Reg. 20,775 (May 8, 2018).

40 CFR part and subpart	Title of subpart	Potentially affected sources in the oil and natural gas production and natural gas processing segments of the oil and natural gas sector
40 CFR part 60, subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification, or Reconstruction Commenced after September 18, 2015	Storage Vessels, Pneumatic Controllers, Compressors (Reciprocating and Centrifugal), Hydraulically Fractured Oil and Natural Gas Well Completions, Pneumatic Pumps and Fugitive Emissions from Well Sites and Compressor Stations
40 CFR part 63, subpart HH	National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities	Glycol Dehydrators
40 CFR part 60, subpart KKKK	Standards of Performance for New Stationary Combustion Turbines	Combustion Turbines

b. EPA's Proposed Approach May Undermine Cooperative Federalism and Lead to Duplication and Inefficiency

As noted above, API does not believe that the one-size-fits-all default language in Attachment B appropriately measures compliance with federal CAA regulations applicable to sources at oil and natural gas exploration and production facilities. We are also concerned however, that this approach would unnecessarily intrude into state regulatory programs and the states' own measures of compliance under state audit programs or otherwise. In particular, the Draft Agreement appears to mirror the Colorado Air Pollution Control Division's ("CAPCD's") Storage Tank and Vapor Control Systems Guidelines.[4] Although CAPCD uses these guidelines to assess compliance with Colorado Regulation Number 7, they remain voluntary guidelines. It is inappropriate to convert voluntary guidelines into mandatory requirements in order to demonstrate compliance and obtain

[4] https://www.colorado.gov/pacific/sites/default/files/041918_StorageTank-presentation.pdf

penalty mitigation, and it is particularly inappropriate to impose these requirements outside of Colorado.

Moreover, many states operate their own audit programs offering penalty mitigation for companies that voluntarily discover and disclose potential violations of air regulations. These states operate their audit programs pursuant to authority delegated to them by EPA under the CAA. Given this delegated authority, we are concerned that EPA intends to require new owners to navigate EPA's audit process even in states that operate their own audit programs. Rather than affirmatively deferring to states with audit programs authorized under the CAA, the Draft Agreement states that "a company may choose to enter into a parallel audit agreement with a state that has a state audit policy." This language, while brief, suggests that EPA will impose its own Audit Policy requirements on top of any state audit program requirements. Such an approach would certainly not improve the efficiency or expand the use of the Audit Policy among new owners of oil and natural gas exploration and production facilities. To the contrary, this approach would likely lead to duplication, inconsistency, redundancy, and confusion.

As EPA has elsewhere recognized, states are effective stewards of environmental protection and, as the primary issuers and enforcers of air permits, are often in the best position to assess compliance. Rather than imposing the Agency's own prescriptive audit agreement requirements, EPA should view compliance with state audit programs as compliance with EPA's audit requirements. EPA should also decline to impose penalties and offer the same assurances against future enforcement to companies utilizing state audit programs as it would under its own program. Doing so is well within EPA's enforcement discretion and fully consistent with the Agency's obligation to defer to states that appropriately exercise their enforcement authority.[5] Failure to do so, on the other hand, risks further disincentivizing use of the Audit Policy as companies will face the prospect of navigating state audit programs alongside new proscriptive federal requirements that differ not only from state regulations, but from federal regulations as well.

i. *Recommended Approach in States with Audit Programs*

EPA's Audit Policy should yield to state audit policies in order to avoid duplication, inefficiency, and inconsistency. As such, API recommends that EPA amend the Draft Agreement to include express language directing that, if the company is proceeding under a state audit program, EPA will not require the company to navigate EPA's Audit Program as well. Any audit, corrective action, disclosure, or agreement made pursuant to a state audit program should automatically be deemed sufficient by EPA. EPA should also amend the Draft Agreement to explicitly disclaim

[5] See January 22, 2018 memorandum from Susan Parker Bodine to Regional Administrators; "Interim OECA Guidance on Enhancing Regional-State Planning and Communication on Compliance Assurance Work in Authorized States."

that the Agency will not second-guess state audit policy procedures or outcomes and that EPA will not impose penalties or requirements different from, or in addition to, that which is agreed to by the state. In order to improve the efficiency of the Audit Policy and promote cooperative federalism, EPA should provide the company the same protection from enforcement for disclosed violations that the state provides.

II. ADDITIONAL RECOMMENDATIONS

While API has significant concerns with the Agency's proposed approach to expanding use of the Audit Policy among new owners of oil and natural gas exploration and production facilities, we appreciate EPA's recognition of this problem and support EPA's interest in addressing it. Transactions in the upstream oil and natural gas industry are quite different than transactions involving manufacturing facilities or other industries that utilize the Audit Policy more frequently. Transactions involving manufacturing facilities are much more focused on the infrastructure and equipment, unlike upstream oil and natural gas transactions, the value of which is driven by acreage, reserves, and development rights. To be sure, large amounts of equipment and infrastructure often conveys with an oil and natural gas transaction, but unlike a manufacturing entity, the equipment and infrastructure is typically comprised of a large number of smaller sources spread over a large geographic area - often in areas that may be difficult to reach at certain times of the year.

These differences are the main reason new owners of oil and natural gas exploration and production facilities do not use the Audit Policy as extensively as new owners of manufacturing or other industrial facilities. To utilize the Audit Policy, a new owner of a manufacturing facility must assess stationary sources and other regulated equipment that is typically located in one or a few locations within reasonable proximity of each other. Often those sources were constructed and are operated under permits that identify specific emission limits, operating parameters, and maintenance, monitoring, recordkeeping, and reporting requirements. In contrast, a new owner of oil and natural gas exploration and production facilities wishing to use the Audit Policy must often inventory hundreds of individual pieces of equipment over a vast area. Some of this equipment remains stationary, but often equipment used in oil and natural gas exploration and production moves from site to site or is swapped out from one site to another. Some of this equipment may be individually permitted under Title V, thereby providing new owners a discrete list of emission limits and requirements from which to assess compliance. Much of the smaller sources, however, are not individually permitted under Title V. This is not to say that the equipment is unregulated. As noted in Subsection I.a.ii. above, these sources are extensively regulated and, to the consternation of new owners, the regulatory requirements applicable to these sources can change significantly depending on location.

In proposing this approach, it is clear that EPA understands this complexity and recognizes it as an impediment to utilization of the Audit Policy among new owners of oil and natural gas exploration and production facilities. EPA's Draft Agreement seemingly attempted to simplify the multijurisdictional regulatory complexity by proposing to adopt audit requirements that are so stringent they could be applied anywhere. This complexity, however, is inherent in, and essential to, the CAA's multijurisdictional and air quality-based approach to regulation.

New owners of oil and natural gas production facilities do not want the Audit Policy to be simplified by adopting a single, excessively stringent measure of compliance. Adopting the most aggressive requirements imposed by any state or compelled through a consent decree is not an appropriate means of mitigating the complex multijurisdictional approach required by the CAA.

Rather than adopting a one-size-fits-all approach to remove the regulatory complexity, EPA should provide new owners of oil and natural gas facilities more time to identify, disclose, and correct violations. The Draft Agreement provides a framework for new owners to negotiate with EPA to establish manageable timeframes. This approach is helpful and reflects the flexible approach necessitated by the highly varied nature of transactions in the upstream oil and natural gas facility. This approach, however, does not provide new owners any certainty that they will actually be able to negotiate workable deadlines with EPA. Uncertainty over whether an owner will be able to timely complete the elements required by the Audit Policy could continue to undermine its use among new owners of oil and natural gas exploration and production facilities.

API therefore recommends that EPA balance the need for both flexibility and certainty by establishing certain minimum default deadlines that would apply to new owners of oil and natural gas exploration and production facilities. New owners would then be assured of some reasonable minimum timeframe for conducting audits, disclosures, and corrective actions but would remain free to negotiate with EPA to extend those deadlines. We would also recommend that new owners are allowed a period of time following acquisition to assess the site(s) and their operation to determine an appropriate period to evaluate the compliance status. Because EPA recognizes the variability and complexity in these transactions, the Draft Agreement should continue to direct that EPA will not unreasonably deny requests for longer deadlines.

III. CONCLUSION

Once again, API appreciates the opportunity to provide these initial questions and comments, and further appreciates the opportunity to supplement these comments after EPA makes more information available. API is also grateful that EPA is meaningfully exploring opportunities to provide the upstream oil and natural gas industry compliance assistance through a more flexible application of the Audit Policy. While we have concerns with EPA's proposed approach, we are

glad to learn that the Agency is committed to addressing industry concerns. If you have questions or wish to discuss further, please feel free to contact me at toddm@api.org or 202.682.8319.

Sincerely,

Matthew Todd

Cc: Susan Bodine, EPA
Bill Wehrum, EPA
Patrick Traylor, EPA
Tim Sullivan, EPA
Christopher Williams, EPA

Message

From: Lewis, Josh [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=B22D1D3BB3F84436A524F76AB6C79D7E-JOLEWIS]
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To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]; Gunasekara, Mandy [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=53d1a3caa8bb4ebab8a2d28ca59b6f45-Gunasekara,]
CC: Wright, Rhonda [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=5d6d041a34ea466dac1f7985308e35ea-RWRIGH04]; Atkinson, Emily [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=bb2155adef6a44aea9410741f0c01d27-Atkinson, Emily]; Millett, John [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=c067caa6c93544f78c26ab08cc567d27-Millett, John]; DeLuca, Isabel [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=0b021c30cbee4637a7c7ca683e5e044a-IDELUCA]
Subject: FW: One pagers for the oil and gas roundtable briefing books
Attachments: ECOS-IOGCC Roundtable - Ozone Designations for 2015 Ozone NAAQS.docx; Roundtable backgrounder.Proposed Stays and NODAs.docx; Roundtable backgrounder.Proposed withdrawal of oil and gas CTG.docx; Roundtable Issue paper. NSPS reconsideration. 1.11.18.docx; Roundtable Issue Paper.TENORM.ORIA.1.11.18.docx

Bill – you'll recall Allison Davis mentioned these at the 5:15 meeting last night. We'll get these in both of your folders today.

These one-pagers are for the briefing books for all of the EPA attendees at the roundtable and they are based on publically available information.

For the roundtable itself, OAQPS was pretty clear that your presence there would be valuable, so we'll look to get you out to Denver on the afternoon/evening of Tuesday 1/23 so you're there for the 3 hours of the meeting on Wednesday. We'll also work some OAR-provided talking pts into Ken Wagner's opening remarks. We can talk more at 10:30 scheduling meeting.

Appointment

From: Dominguez, Alexander [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=5CED433B4EF54171864ED98A36CB7A5F-DOMINGUEZ,]
Sent: 12/13/2017 4:05:38 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]

Subject: Accepted: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Location: WJC-N 5400 + Video with OAQPS

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Busy

Appointment

From: Tsirigotis, Peter [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=D19C179F3CCB4FADB48E3AE85563F132-PTSIRIGO]
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Location: WJC-N 5400

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM

Recurrence: (none)

Appointment

From: Murphy, Tina [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=03E381B938CD4B279E8DA793984C33F1-MURPHY, TINA]
Sent: 12/13/2017 12:34:09 PM
To: Wehrum, Bill [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=33d96ae800cf43a3911d94a7130b6c41-Wehrum, Wil]

Subject: Accepted: Meet with Shell re: OOOOa NSPS Reconsideration Rulemaking (Confirmed)
Location: WJC-N 5400

Start: 12/13/2017 3:15:00 PM
End: 12/13/2017 4:00:00 PM
Show Time As: Busy

Message

From: Wehrum, Bill [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=33D96AE800CF43A3911D94A7130B6C41-WEHRUM, WIL]
Sent: 9/13/2018 6:56:43 PM
To: Tsirigotis, Peter [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=d19c179f3ccb4fadb48e3ae85563f132-PTSIRIGO]
Subject: FW: RE: ACTION: methane paper
Attachments: Oil and natural gas ES&T manuscript.pdf

Bill Wehrum
Assistant Administrator
Office of Air and Radiation
U.S. Environmental Protection Agency
(202) 564-7404

From: DeLuca, Isabel
Sent: Thursday, September 13, 2018 2:22 PM
To: Wehrum, Bill <Wehrum.Bill@epa.gov>; Gunasekara, Mandy <Gunasekara.Mandy@epa.gov>; Woods, Clint <woods.clint@epa.gov>; Harlow, David <harlow.david@epa.gov>; Dominguez, Alexander <dominguez.alexander@epa.gov>
Cc: Millett, John <Millett.John@epa.gov>
Subject: FW: RE: ACTION: methane paper

Hi All,
Wanted you to be aware of an inquiry from Lisa Friedman from the NY Times about a paper written by EPA scientists, *Assessing Human Health PM2.5 and Ozone Impacts from US Oil and Gas Sector Emissions in 2025*(paper attached). Below are the questions and OAQPS's suggested responses. Lisa has requested a response by 5PM today--if you have concerns or expect to have edits, please let me know and I'll hold.

Thanks,
Isabel

First I would like to just know a little bit more about how this paper came about. How long was it in the works and what were you and your colleagues seeking to understand.

Deliberative Process / Ex. 5

Deliberative Process / Ex. 5

Is this part of a larger body of E.P.A. scientific studies on this issue? And forgive my ignorance here - is it pretty common for E.P.A. scientists to publish papers in journals?

Deliberative Process / Ex. 5

On the findings themselves I'd like to understand Table 3 better. Am I correct in understanding that you and your colleagues have found up to 1,400 premature deaths across 10 states starting in 2025 related to ozone and another 1100-2700 total w/ an increase in PM2.5?

Deliberative Process / Ex. 5

I think I'd also love some clarity about the states chosen - which I assume are because they are the biggest oil and gas states but just want to make sure.

Deliberative Process / Ex. 5

Any reason why the premature death rate, which features so prominently in the discussion, is not part of the abstract?

Deliberative Process / Ex. 5

How if at all did this study or should this study have informed the methane rollback RIA that just came out which noted the future is too inconclusive to draw good data on premature deaths? Can you guys offer some further explanation of the RIA in the methane proposal regarding the premature deaths? I want to make sure I understand why the agency found that it was unable to make projections on premature deaths due to data limitations when this study seems to be able to do so. Were there restrictions on using this study? Was it not out in time? Data there was found to be inconclusive? Some other reason?

Deliberative Process / Ex. 5

Isabel DeLuca
Office of Air and Radiation, US EPA
(202) 343-9247

Message

From: Wehrum, Bill [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=33D96AE800CF43A3911D94A7130B6C41-WEHRUM, WIL]
Sent: 11/20/2017 12:40:34 AM
To: Lewis, Josh [/o=ExchangeLabs/ou=Exchange Administrative Group (FYDIBOHF23SPDLT)/cn=Recipients/cn=b22d1d3bb3f84436a524f76ab6c79d7e-JOLEWIS]
Subject: Fwd: Shell Request for Meeting/Call on the Upcoming OOOOa Reconsideration Rulemaking

Sent from my iPhone

Begin forwarded message:

From: Stephen Fotis <scf@vnf.com>
Date: November 19, 2017 at 3:58:17 PM EST
To: "'wehrum.bill@epa.gov'" <wehrum.bill@epa.gov>, "'wehrum.william@epa.gov'" <wehrum.william@epa.gov>
Cc: "loving.shanita@epa.gov" <loving.shanita@epa.gov>, "harlow.david@epa.gov" <harlow.david@epa.gov>
Subject: Shell Request for Meeting/Call on the Upcoming OOOOa Reconsideration Rulemaking

Bill – I hope you had a good first week at EPA. Although I know how busy you must be, I would like to get on your schedule for a short meeting with Shell regarding several high-priority air issues. The primary focus of our meeting will be on several important high-level considerations regarding EPA's upcoming OOOOa reconsideration rulemaking – although we would like to touch base very quickly on a few other air regulatory issues. We don't need a lot of your time, definitely less than 30 minutes or less, and would be happy to talk by telephone if a conference call is more convenient for you than a meeting. I would be joined in our meeting/call by Marnie Funk, who heads governmental relations on environmental issues for Shell.

We know how busy you must be and thus appreciate any time that you can provide to talk at your earliest convenience. I am copying your assistant Shanita Loving along with David Harlow just in case you would like for either one of them to follow up on your behalf.
Best,
Stepehn